STUDENTS GUIDE

for

AN/ARC-51, 51AX, 51B RT-793/ASQ AND RT-1010/ASQ-140 COMMUNICATIONS SYSTEMS INTERMEDIATE MAINTENANCE COURSE

C-102-3014

SECTION I (INFORMATION SHEETS)
SECTION IV (DIAGRAMS)

NOT AUTHORIZED FOR

USE IN MAINTENANCE

WORK CENTERS

CNTT N2041D (9—84)

NAVAL AIR MAINTENANCE TRAINING GROUP
FOR TRAINING PURPOSES ONLY

NOT AUTHORIZED FOR USE IN MAINTENANCE WORK CENTERS

NAVAL AIR MAINTENANCE TRAINING GROUP

STUDENT GUIDE

FOR

AN/ARC-51, 51A, 51AX, 51B, RT-793/ASQ AND RT-1010/ASQ-140
COMMUNICATIONS SYSTEMS
INTERMEDIATE MAINTENANCE COURSE

C-102-3014

SECTION I (Information Sheets)

Section IV (Diagrams)

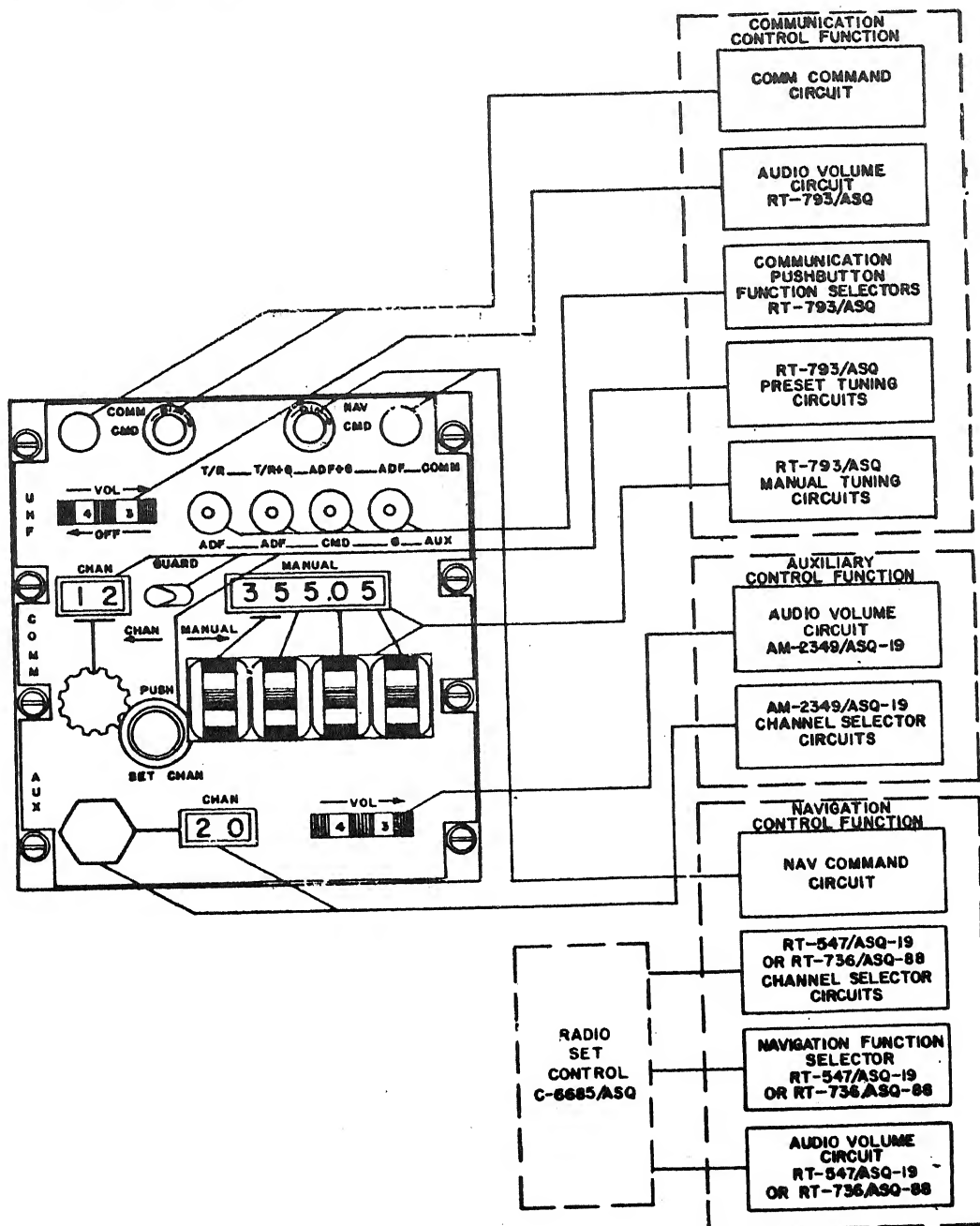CNTT N 2041D

SEPTEMBF'

(FOR TRAINING
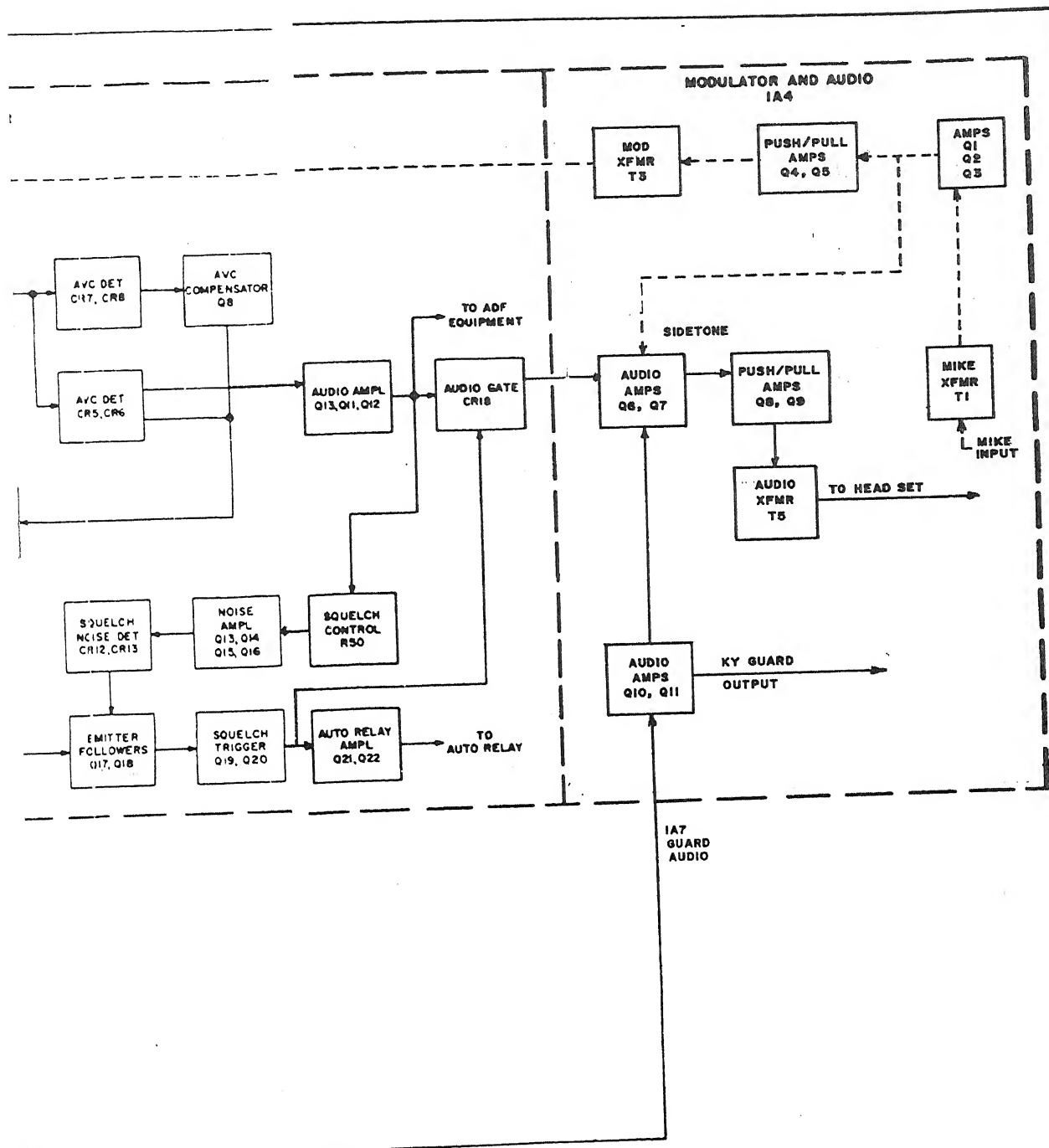
SECTION I TABLE OF CONTENTS

INJECTION FREQUENCIES

SPECTRUM GENERATOR		FIRST AND SECOND IF. AMPLIFIER				
CHANNEL FREQUENCY (22X.XX to 39X.XX-mc)	INJECTION FREQUENCY	CHANNEL FREQUENCY (XX0.XX to XX9.XX mc)	INJECTION FREQUENCY HFO	CHANNEL FREQUENCY (XXX.00 to XXX.95 mc)	TRANSMIT INJECTION FREQUENCY LFO	RECEIVE INJECTION FREQUENCY LFO
22X.XX	200	XX0.XX	17.1 (Y11)	XXX.00	2.90 (Y1)	3.40 with 500-kc if.
23X.XX	210	XX1.XX	18.1 (Y12)	XXX.05	2.95 (Y21)	3.45 with 500-kc if.
24X.XX	220	XX2.XX	19.1 (Y13)	XXX.10	3.00 (Y2)	3.50 with 500-kc if.
25X.XX	230	XX3.XX	20.1 (Y14)	XXX.15	3.05 (Y22)	3.55 with 500-kc if.
26X.XX	240	XX4.XX	21.1 (Y15)	XXX.20	3.10 (Y3)	3.60 with 500-kc if.
27X.XX	250	XX5.XX	22.1 (Y16)	XXX.25	3.15 (Y23)	3.65 with 500-kc if.
28X.XX	260	XX6.XX	23.1 (Y17)	XXX.30	3.20 (Y4)	3.70 with 500-kc if.
29X.XX	270	XX7.XX	24.1 (Y18)	XXX.35	3.25 (Y24)	3.75 with 500-kc if.
30X.XX	280	XX8.XX	25.1 (Y19)	XXX.40	3.30 (Y5)	3.80 with 500-kc if.
31X.XX	290	XX9.XX	26.1 (Y20)	XXX.45	3.35 (Y25)	3.85 with 500-kc if.
32X.XX	300			XXX.50	3.40 (Y6)	2.90 with 500-kc if.
33X.XX	310			XXX.55	3.45 (Y26)	2.95 with 500-...
34X.XX	320			XXX.60	3.50 (Y7)	
35X.XX	330			XXX.65		
36X.XX	340					
37X.XX	350					
38X.XX	360					
39X.XX	370			XXX.85	3.75 (Y29)	3.25 with 500-kc if.
				XXX.90	3.80 (Y10)	3.30 with 500-kc if.
				XXX.95	3.85 (Y30)	3.35 with 500-kc if.

C-6684/ASQ RADIO SET CONTROL

COMMUNICATION CONTROL FUNCTION

COMM COMMAND CIRCUIT

AUDIO VOLUME CIRCUIT RT-793/ASQ

COMMUNICATION PUSHBUTTON FUNCTION SELECTORS RT-793/ASQ

RT-793/ASQ PRESET TUNING CIRCUITS

RT-793/ASQ MANUAL TUNING CIRCUITS

AUXILIARY CONTROL FUNCTION

AUDIO VOLUME CIRCUIT AM-2349/ASQ-19

AM-2349/ASQ-19 CHANNEL SELECTOR CIRCUITS

NAVIGATION CONTROL FUNCTION

NAV COMMAND CIRCUIT

RT-547/ASQ-19 OR RT-736/ASQ-88 CHANNEL SELECTOR CIRCUITS

NAVIGATION FUNCTION SELECTOR RT-547/ASQ-19 OR RT-736/ASQ-88

AUDIO VOLUME CIRCUIT RT-547/ASQ-19 OR RT-736/ASQ-88

RADIO SET CONTROL C-6685/ASQ

MODULATOR AND AUDIO
1A4

MOD
XFMR
T3

PUSH/PULL
AMPS
Q4, Q5

AMPS
Q1
Q2
Q3

AVC DET
CR7, CR8

AVC
COMPENSATOR
Q8

TO ADF
EQUIPMENT

SIDETONE

AVC DET
CR5, CR6

AUDIO AMPL
Q13, Q11, Q12

AUDIO GATE
CR18

AUDIO
AMPS
Q6, Q7

PUSH/PULL
AMPS
Q8, Q9

MIKE
XFMR
T1

MIKE
INPUT

AUDIO
XFMR
T5

TO HEAD SET

SQUELCH
NOISE DET
CR12, CR13

NOISE
AMPL
Q13, Q14
Q15, Q16

SQUELCH
CONTROL
R50

EMITTER
FOLLOWERS
Q17, Q18

SQUELCH
TRIGGER
Q19, Q20

AUTO RELAY
AMPL
Q21, Q22

TO
AUTO RELAY

AUDIO
AMPS
Q10, Q11

KY GUARD
OUTPUT

1A7
GUARD
AUDIO

RT-743/ARC-51A, Block Diagram

1

AC/DC Power Supply

Labels (top, vertical):
115 Vac PH3 · 115 Vac PH2 · 55 Vdc · GROUND · 115 Vac PH1 · -12 Vdc BIAS · -6 Vdc BIAS · 27.5 Vdc Transmit · 220 Vdc Cont. · 460 Vdc Cont.

P1 pins: 12 14 10 · 9 11 · 3 · 6 · 1 5 · 15 · 4 · 8 · P1

CR12 1N645
CR11 1N645
CR13 1N645

CR8 1N753A · CR9 1N753A
J3 -6V DC TEST
-12V DC TEST · J4
R4 1200

CR7 1N649 · R3 6800 · C4 6.8UF

J2 +220V DC TEST
J1 +460V DC TEST
R2 150K

CR6 1N649
CR5 1N649
CR4 1N649
CR10 1N645
CR3 1N649
CR2 1N649
CR1 1N649

C7 .01UF · C6 .01UF

DUAL FILTER CHOKE
.5H · L1 · .2H
C3 12UF

C5 .01UF · C1 2.5UF · C2 2.5UF
R1 470K

AC-DC POWER SUPPLY 1A8

NOTE:
UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS.
ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS.

AC/DC Power Supply

DC POWER SUPPLY
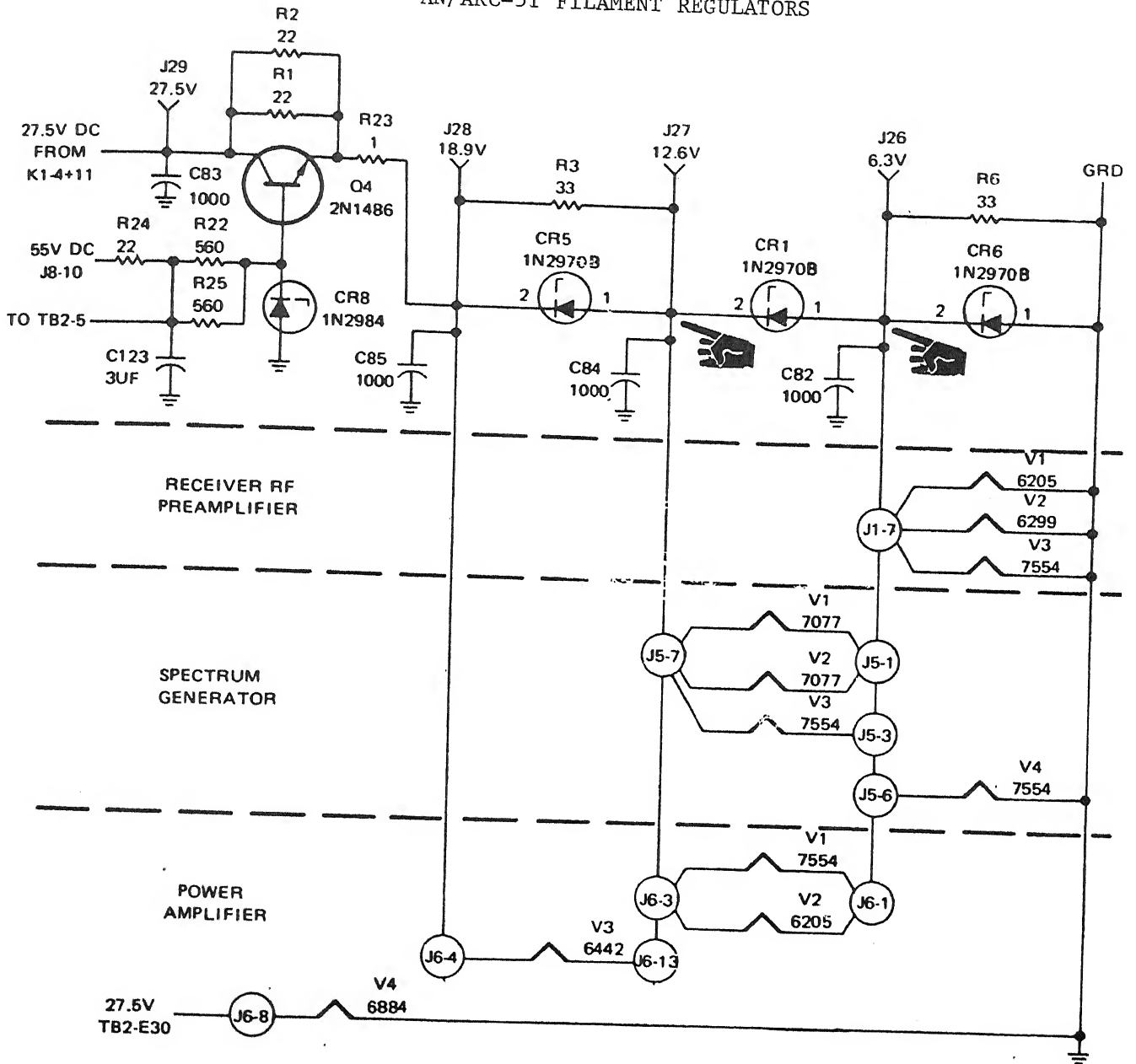
RT-743/ARC-51A, Schematic Diagram (Sheet 1 of 2)

NOTES:

1. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN PICOFARADS, AND INDUCTANCE VALUES ARE IN MICROHENRYS.
2. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH THE UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.
3. CAPACITOR IS BUILT INTO TUNING SHAFT (340UUF)
4. CATHODE AND FILAMENT ARE CONNECTED
5. CONNECTIONS FOR AUDIO OUTPUT IMPEDANCE AND BANDWIDTH REMOVE ALL OTHER JUMPERS

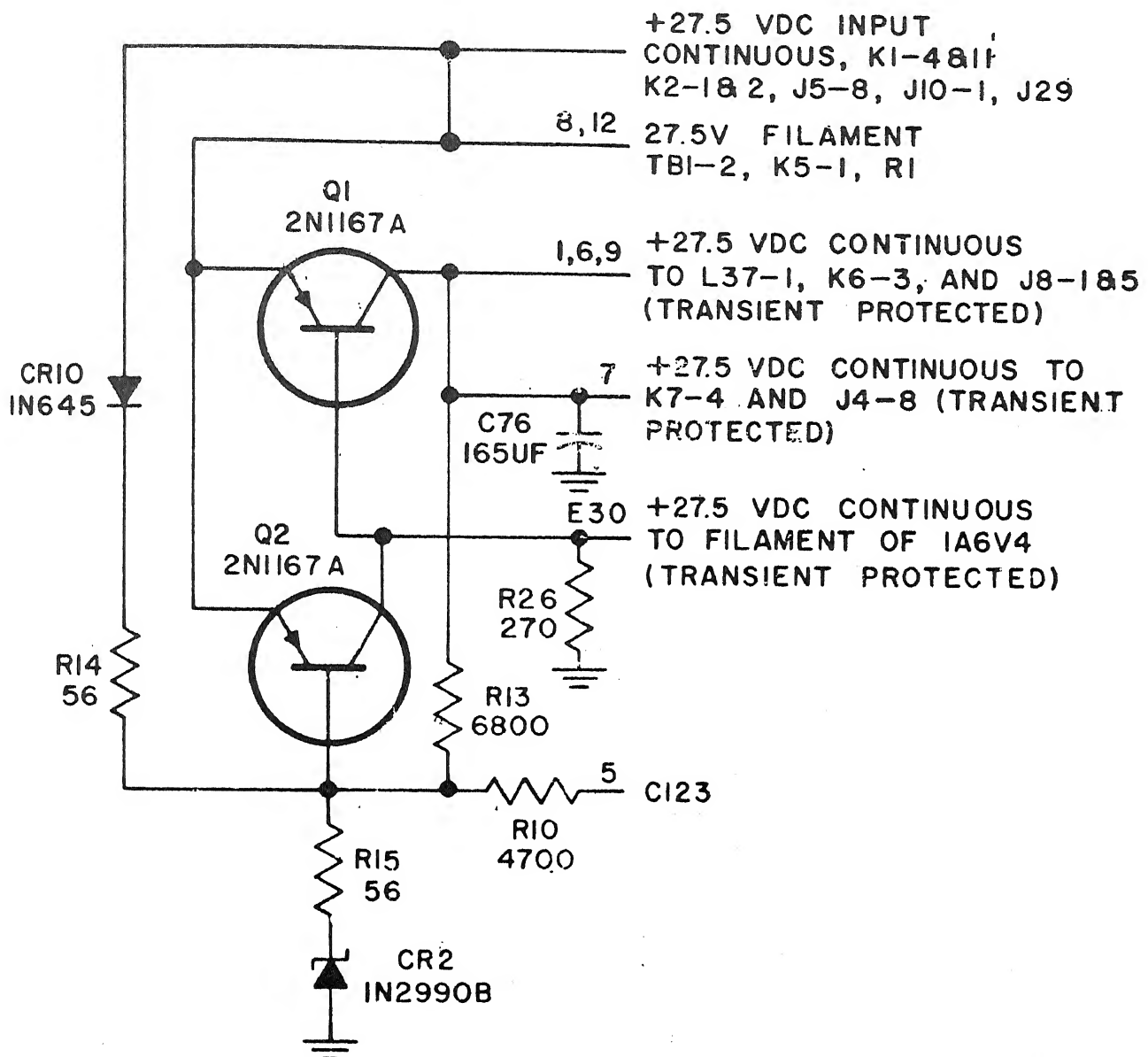| $Z_0 = 150$ OHMS 6KC BW	$Z_0 = 150$ OHMS 4KC BW	$Z_0 = 600$ OHMS 6KC BW	$Z_0 = 600$ OHMS 4KC BW
ON 1A4T2 6-8 7-9	ON 1A4T2 6-8 7-9	ON 1A4T2 6-9	ON 1A4T2 6-9
ON 1A4TB2 2-5 1-4 3-7	ON 1A4TB2 2-5 1-4 3-7 R26 (100) BETWEEN 2-4	ON 1A4TB2 2-5 6-7	ON 1A4TB2 2-5 6-7 R26 (1K) BETWEEN 1-4
1A4T2-8 TO 1A4TB2-5	1A4T2-8 TO 1A4TB2-5	1A4T2-8 TO 1A4TB2-1	1A4T2-8 TO 1A4TB2-1

6. DASHED LINES INDICATE CONNECTIONS FOR USE OF DYNAMIC MIKE. SOLID CONNECTIONS ARE FOR CARBON MIKE. FOR DYNAMIC MIKE CONNECTIONS MOVE WIRES FROM TI-2 TO TI-3
7. CONNECT AS SHOWN BY THE DOTTED LINE FOR SILENT CHANNEL TONE. CONNECT AS SHOWN BY THE SOLID LINES FOR 400 CPS CHANNEL TONE
8. 1A10FL1 SYMBOL NUMBERS INCLUDE L2 THRU L30 AND L40 THRU L54 CHOKES, VALUE 39UM, L55 THRU L154 FERRITE BEADS, C5 THRU C61 AND C90 THRU C121, VALUE 400UUF
9. FRONT AND BACK ROTORS ARE ELECTRICALLY CONNECTED. WITH POSITIONS SHOWN, 1 ST IF IS TUNED TO 25 MC
10. FRONT AND BACK ROTORS ARE SEPARATE. FRONT ROTOR IS FOR TRANSMIT, BACK ROTOR IS FOR RECEIVE. WITH POSITION SHOWN, 2ND IF IS TUNED TO 2.9 MC.
11. JUMPER TB1-5 TO TB1-6 FOR AUDIO GROUND IN CHASSIS. OPEN TB1-5 TO TB1-6 FOR FLOATING AUDIO OUTPUT LINE
12. Q1 AND Q2 ARE LOCATED NEXT TO TERMINAL BOARD TB2.
13. ●——► FRONT TERMINAL
    ○--► REAR TERMINAL
    ●——► FRONT AND REAR TERMINAL ELECTRICALLY CONNECTED
14. THE VALUE OF R48 IS SELECTED SO THAT NOISE LIMITING AS OBSERVED AT A4J3 OCCURS BETWEEN 35 AND 65 PERCENT MODULATION. VALUE RANGE IS FROM 47K TO 120K

J12

Pin	Signal
D	
Y	GROUND
X	
W	SPARE
M	
S	AUTO RELAY
L	AUX AUDIO
J	PH3
K	PH2 / 115 VAC, 400 CPS
F	PH1
Z	SPARE
A	27 5 VDC
B	
E	275 VDC ADF RELAY
V	MIKE
G	
U	PHONE
R	
b	AVC TEST
T	POWER ON-OFF
P	TR
C	GUARD ON-OFF
H	ADF 225V PLATE POWER
a	SQUELCH DISABLE

22C, 18C, 15D, 13C, 20D, 20C, 19D, 19C, 21D, 21C, 14D, 18D, 15C, 22D, 16D, 12D, 17C, 17D, 12C, 16C, 14C, 13D

J11

Pin	Signal
3	SPARE
8	SPARE
W	
P	FREQ CONT 200-A
b	FREQ CONT 10-E
R	FREQ CONT SPARE
U	FREQ CONT 10-B
S	FREQ CONT 10-D
V	FREQ CONT 10-A
T	FREQ CONT 10-C
X	FREQ CONT 300-B
5	FREQ CONT .05B
N	FREQ CONT 1-D
L	FREQ CONT 1-A
K	FREQ CONT 1-C
J	FREQ CONT 1-E
M	FREQ CONT 1-B
E	FREQ CONT SPARE
H	FREQ CONT .1-D
Y	FREQ CONT .1-A
Z	FREQ CONT .1-C
6	FREQ CONT .1-E
F	FREQ CONT .1-B

3D, 8C, 11D, 5D, 10C, 9C, 5C, 9D, 10D, 8D, 6C, 11C, 7D, 7C, 2D, 6D, 4D, 3C, 2C, 1D, 1C, 4C

RT-743/ARC-51A, Schematic Diagram
(Sheet 2 of 2)

AN/ARC-51 FILAMENT REGULATORS

TRANSIENT PROTECTED CIRCUITRY

RF AMPL, TR

V3
8727/7554

C17
20

Z3

C19
2

P5 J17

225.00
399.95MHz

20.0

L4
0.33

L5
0.47

C15
500

C18
0.6-3

C14
500

R8
I MEG

J3

200-
I:
Dur:

R10
2200

AN:

10,

AMPL, XMTR

P3-AI | J2I-AI
20.00 - 29.95MHz
OUTPUT DURING
RECEIVE

V4
5884

Z3

C17
1400

C36
10

C20
1.3-6

C48
.OIUF

R12
IMEG

L6
.47

C19
SEE NOTE 3

J4

R14
12K

C39
500

C1
1000

R16
10

C22
500

C35
500

J6(-)

C31
400

R2
IMEG

R13
15K

C18
500

C45
500

J7(+)

VI

V2

L8
.22

L7
.22

L19

L17

L20

L18

C23
400

C34
400

C28
400

POWER
AMPLIFIER
IA6

1

3

9

PI

6.3 V dc Fil.

12.6 V dc Fil.

460 V dc Trans.

10, 1.0 AND 0.1MHz
DIFF SHAFT

.TED, ALL RESISTANCE VALUES ARE IN OHMS,
.RE IN MICROHENRYS, ALL CAPACITANCE
.OFARADS.·
.RE CONNECTED.
.UNING SHAFT (400 UUF).
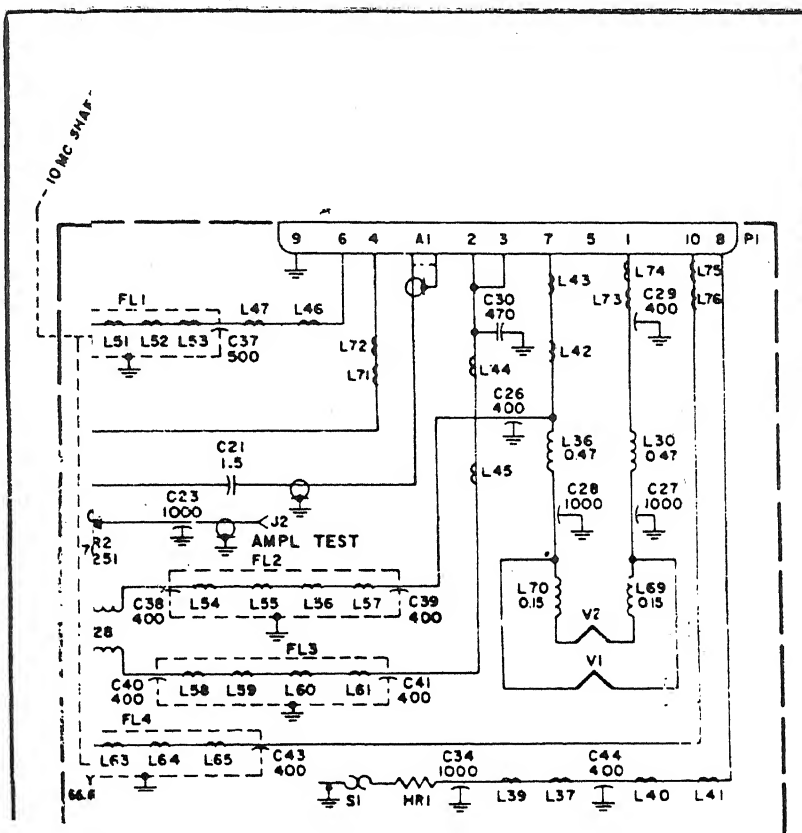
FUNCTION

200- to 370-mc output
6.3-volt d-c filament
18.9-volt d-c filament
240-volt d-c continuous
Not used
6.3-volt d-c filament
12. 6-volt d-c filament
27.5-volt d-c continuous
Ground
Not used in AN/ARC-51 or AN/ARC-51A

First and Second I-F Amplifier Module Schematic Diagram

12

.00A FREQ CONT ON J2-G IS PROVIDED FOR FUTURE USE WITH REMOTE INDICATOR.
ALL CONTACTS ON S5 REAR SIDES ARE IN ALTERNATE POSITIONS.
FOR USE IN DUAL CONTROL INSTALLATIONS REMOVE JUMPER WIRE FROM TB1 PIN 37 TO GRD NO.2.

FREQUENCY SELECTOR
TWO-OUT-OF-FIVE
BINARY CODE
"X"- INDICATES WIRE GROUNDED ON SPECIFIC DIAL POSITIONS

10 MC DIAL

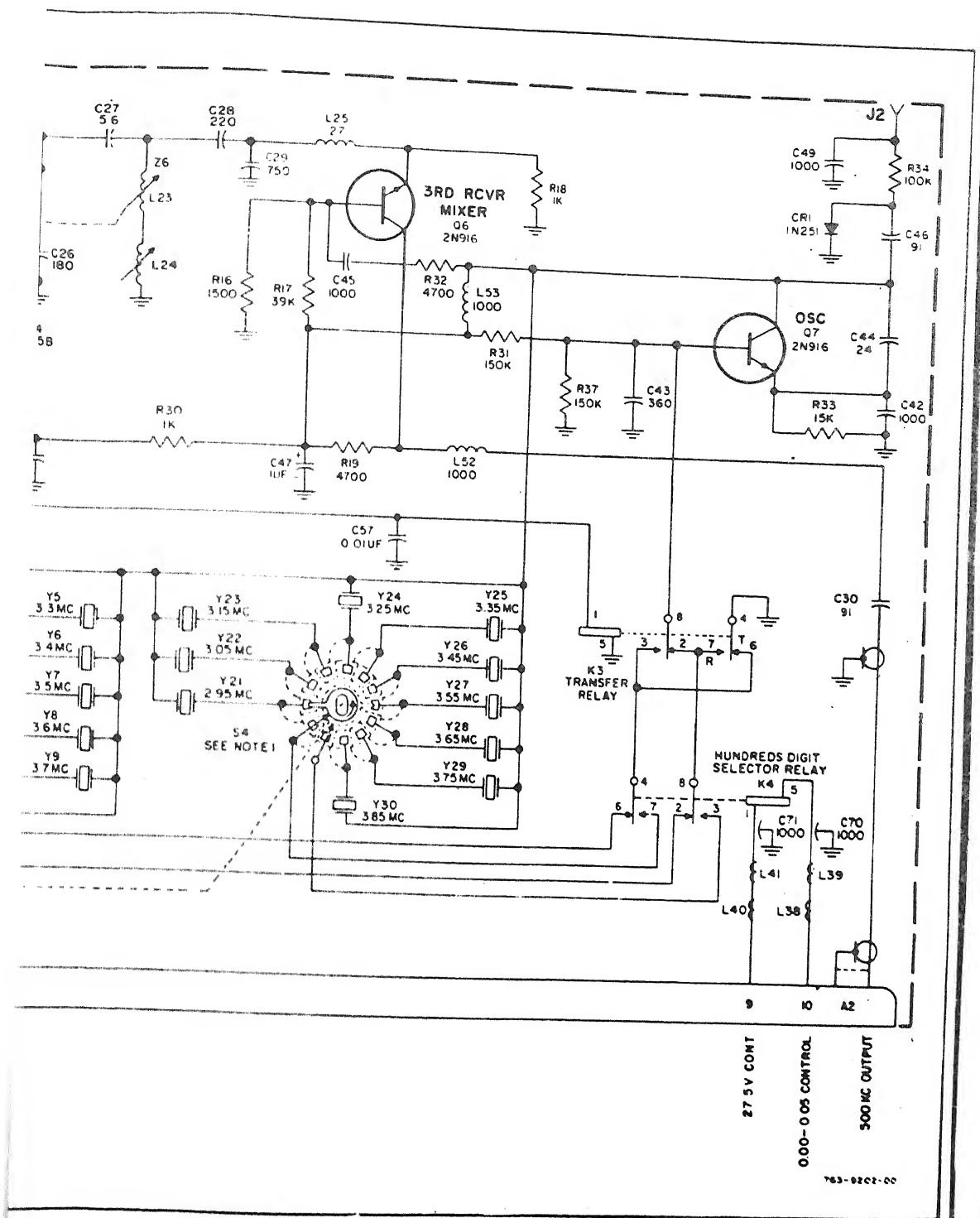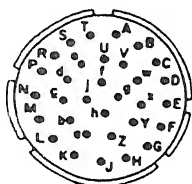| 20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
	X	X						X	X		X	X						X	X	10-A	J2-U
X	X		X	X							X	X		X	X					10-B	J2-V
		X	X		X	X							X	X		X	X			10-C	J2-W
				X	X		X	X							X	X		X	X	10-D	J2-X
X							X	X	X	X						X	X		X	10-E	J2-Z
		X	X	X	X	X	X	X	X											200-A	J2-K
X	X											X	X	X	X	X	X	X	X	300-B	J2-M

1 MC DIAL

0	1	2	3	4	5	6	7	8	9		
	X	X						X	X	1-A	J2-a
X	X		X	X						1-B	J2-b
		X	X		X	X				1-C	J2-c
				X	X		X	X		1-D	J2-d
X							X	X	X	1-E	J2-T

.1 MC DIAL

.00	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95		
		X	X	X	X										X	X	X	X		1-A	J2-f
X	X	X	X			X	X	X	X												
				X	X	X	X														
X	X																				
X		X		X																	
	X		X																		

NOTE:
UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN MICROMICRO-FARADS.

Standing Wave Ratio Indicator ID-1003/ARC, Schematic Diagram

MC	200MC/ 300MC
5	17	35

S1, S2 CONNECTIONS		0	1	2	3	4	5	6	7	8	9		
CONNECTION THRU SWITCH	A	X	O	O	X	X	X	X	X	O	O	X	X
	B	O	O	X	O	O	X	X	X	X	X	X	X
	C	X	X	X	O	O	X	O	O	X	X	X	X
OPEN THRU SWITCH	D	X	X	X	X	X	O	O	X	O	O	X	X
	E	O	X	X	X	X	X	X	O	O	X	O	X	O

200MC AND 300MC

SHAFT OUTPUT
)° FOR IOMC) { TO SPECTRUM GENERATOR

1.0 AND 0.1 MC
:RENTIAL OUTPUT
).I° FOR 0.IMC) { TO POWER AMPLIFIER
0.0° FOR 1.0MC) { AND RECEIVER-PREAMP
10° FOR IOMC)

J10 >

: SHAFT OUTPUT { TO FIRST AND SECOND
IO° FOR IMC) { IF AMPLIFIER (HF OSC)

) AND 0.1 MC
:RENTIAL OUTPUT { TO FIRST AND SECOND
}° FOR 0.IMC) { IF AMPLIFIER
O° FOR 1.0MC) { (FIRST IF SLUG TABLE)

CRI45

VR29
IN758A

Q29

VR30
IN754A

R84
6800

R85
2200

R86
6800

R87
2200

SHAFT OUTPUT { TO FIRST AND SECOND
IO° FOR IMC) { IF AMPLIFIER (LF OSC)

S3 AND S4 CONNECTIONS		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
	A	O	X	X	X	X	X	X	O	O	X	O	O	X	X	X	X	O	O
	B	X	O	O	X	X	X	X	X	X	O	O	X	O	O	X	X	X	X
CONNECTION THRU SWITCH	C	O	O	X	O	O	X	X	X	X	X	X	O	O	X	O	O	X	X
	D	X	X	O	O	X	O	O	X	X	X	X	X	X	O	O	X	O	O	X
OPEN THRU SWITCH	E	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	O	X	O
	200A	O	O	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X
	300B	X	X	X	X	X	X	X	X	O	O	O	O	O	O	O	O	O	O

PLUG AND PIN NUMBER	FUNCTION
P1-14	1-A frequency control
P1-15	1-B frequency control
P1-16	1-C frequency control
P1-17	Frequency control spare
P1-18	0.1-A frequency control
P1-19	0.1-B frequency control
P1-20	0.1-C frequency control
P1-21	0.1-D frequency control
P1-22	Frequency control spare
P1-23	0.1-E frequency control
P1-24	Ground
P1-25	Not used

Static Frequency (...odule (RT-743/ARC-51A), Schematic Diagram